CSE 344

section 7_extra (this is the supplementary material that only covers the example of using subclass for E/R diagrams)

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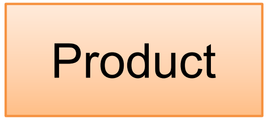
CONTEXT-SPECIFIC (DTD-BASED) MAPPING

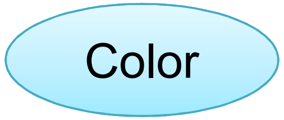
```
<!DOCTYPE bib [
        <!ELEMENT bib  (book* )>
        <!ELEMENT book  (title,  (author+ | editor+ ), publisher?, price )>
        <!ATTLIST book  year CDATA  #REQUIRED >
        <!ELEMENT author  (last, first )>
        <!ELEMENT editor  (last, first, affiliation )>
        <!ELEMENT title  (#PCDATA )>
        <!ELEMENT last  (#PCDATA )>
        <!ELEMENT first  (#PCDATA )>
        <!ELEMENT affiliation  (#PCDATA )>
        <!ELEMENT publisher  (#PCDATA )>
        <!ELEMENT price  (#PCDATA )>
]>
```

(Recall) Entity / Relationship Diagrams

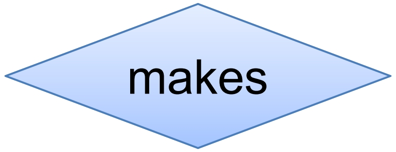
- Entity set = a class
  - An entity = an object



- Attribute



- Relationship



What Kinds of Entities?

```
<!DOCTYPE bib [
        <!ELEMENT bib  (book* )>
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        <!ELEMENT editor  (last, first, affiliation )>
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        <!ELEMENT affiliation  (#PCDATA )>
        <!ELEMENT publisher  (#PCDATA )>
        <!ELEMENT price  (#PCDATA )>
]>
```
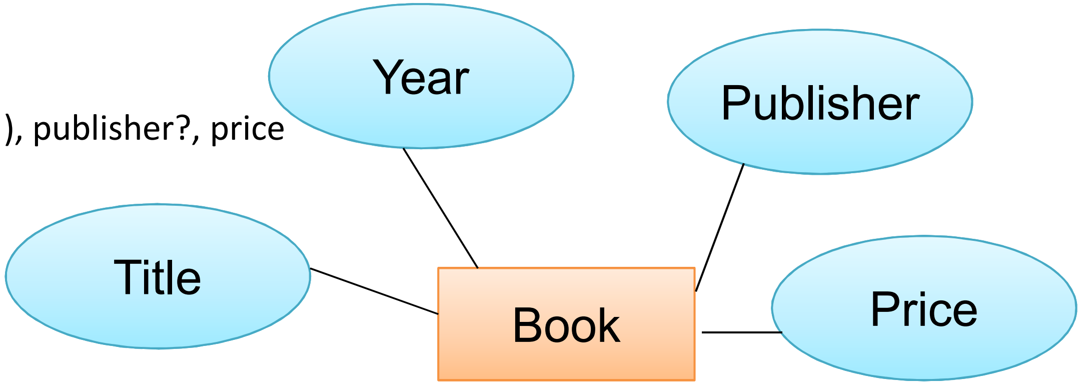
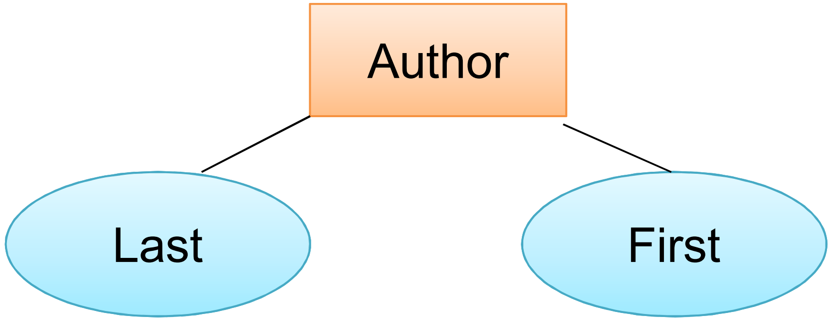
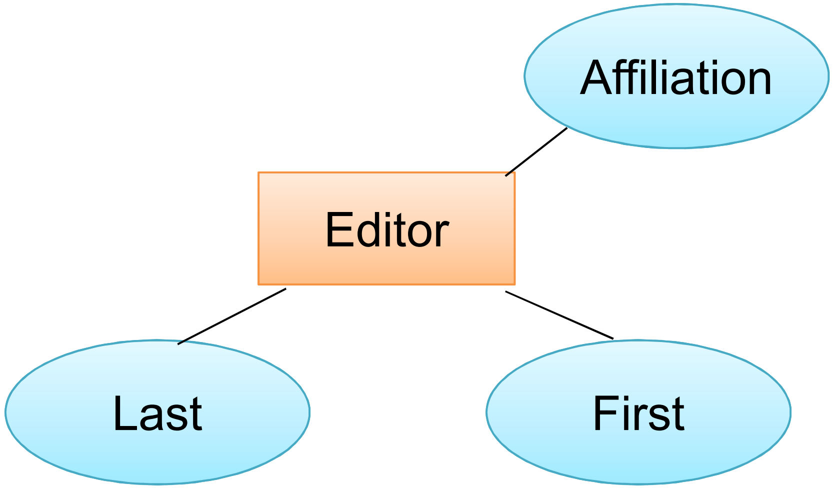
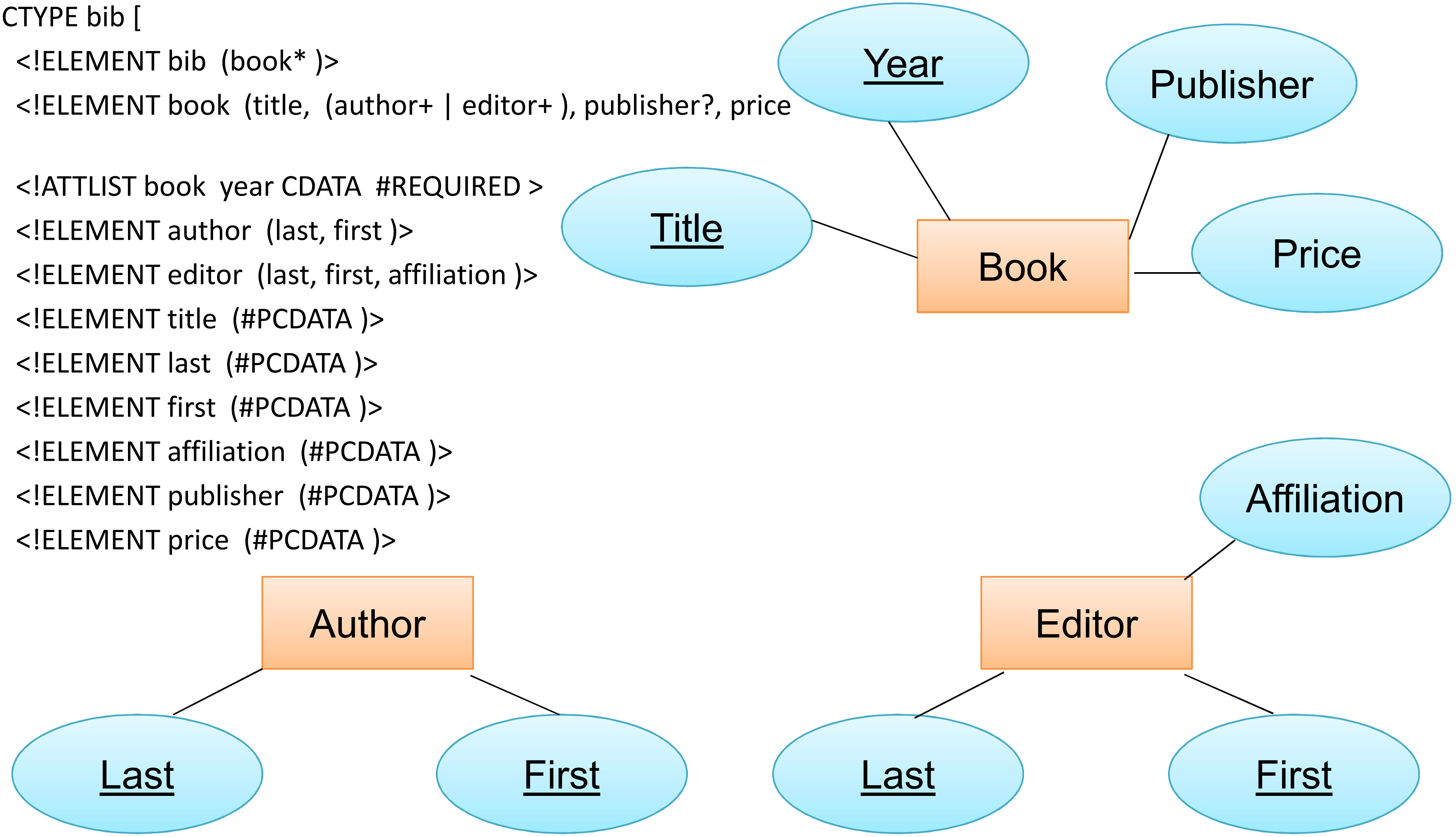





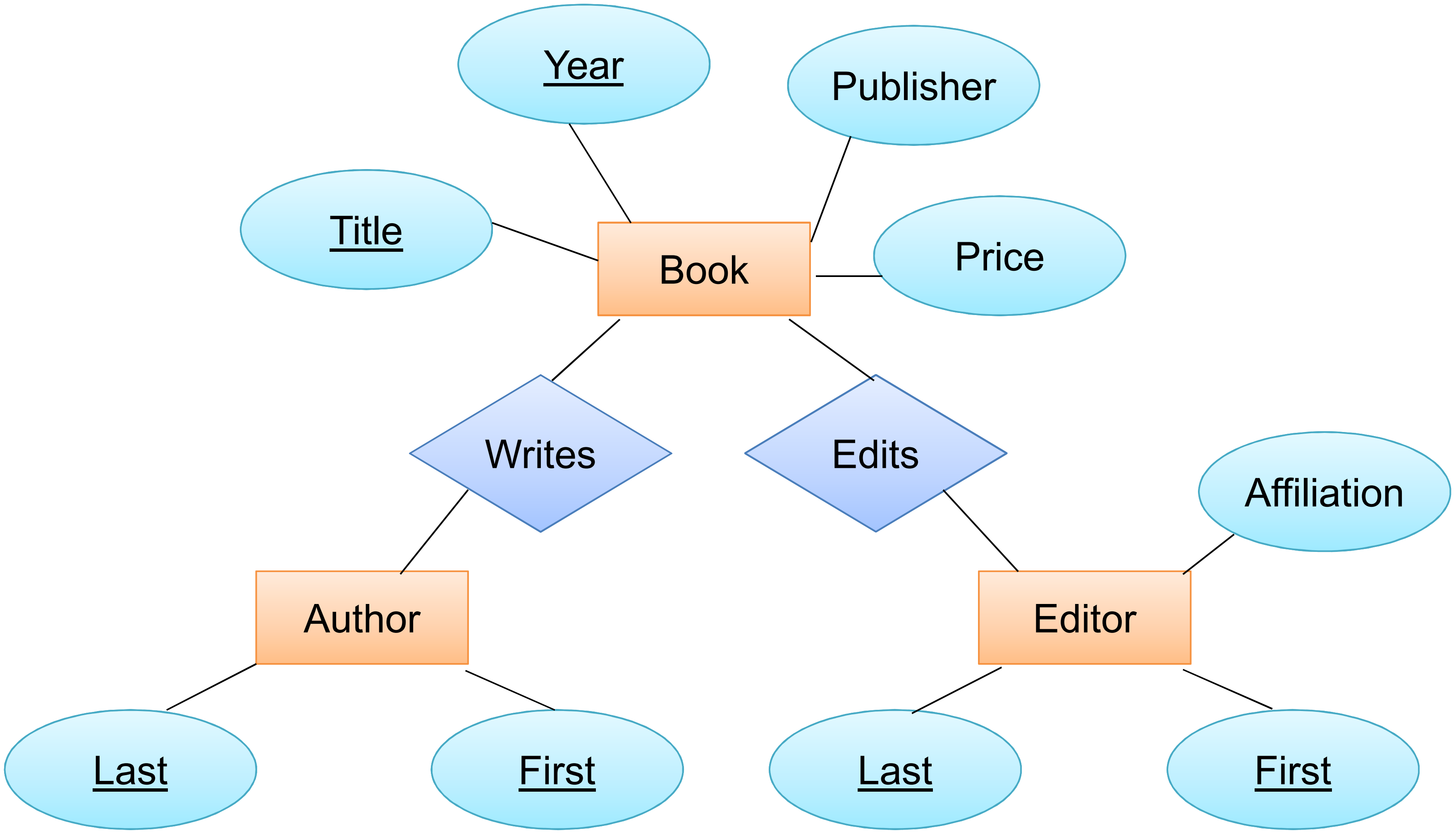


Primary Key in each Entity

```
<!DOCTYPE bib [
        <!ELEMENT bib  (book* )>
        <!ELEMENT book  (title,  (author+ | editor+ ), publisher?, price
)>
        <!ATTLIST book  year CDATA  #REQUIRED >
        <!ELEMENT author  (last, first )>
        <!ELEMENT editor  (last, first, affiliation )>
        <!ELEMENT title  (#PCDATA )>
        <!ELEMENT last  (#PCDATA )>
        <!ELEMENT first  (#PCDATA )>
        <!ELEMENT affiliation  (#PCDATA )>
        <!ELEMENT publisher  (#PCDATA )>
        <!ELEMENT price  (#PCDATA )>
]>
```



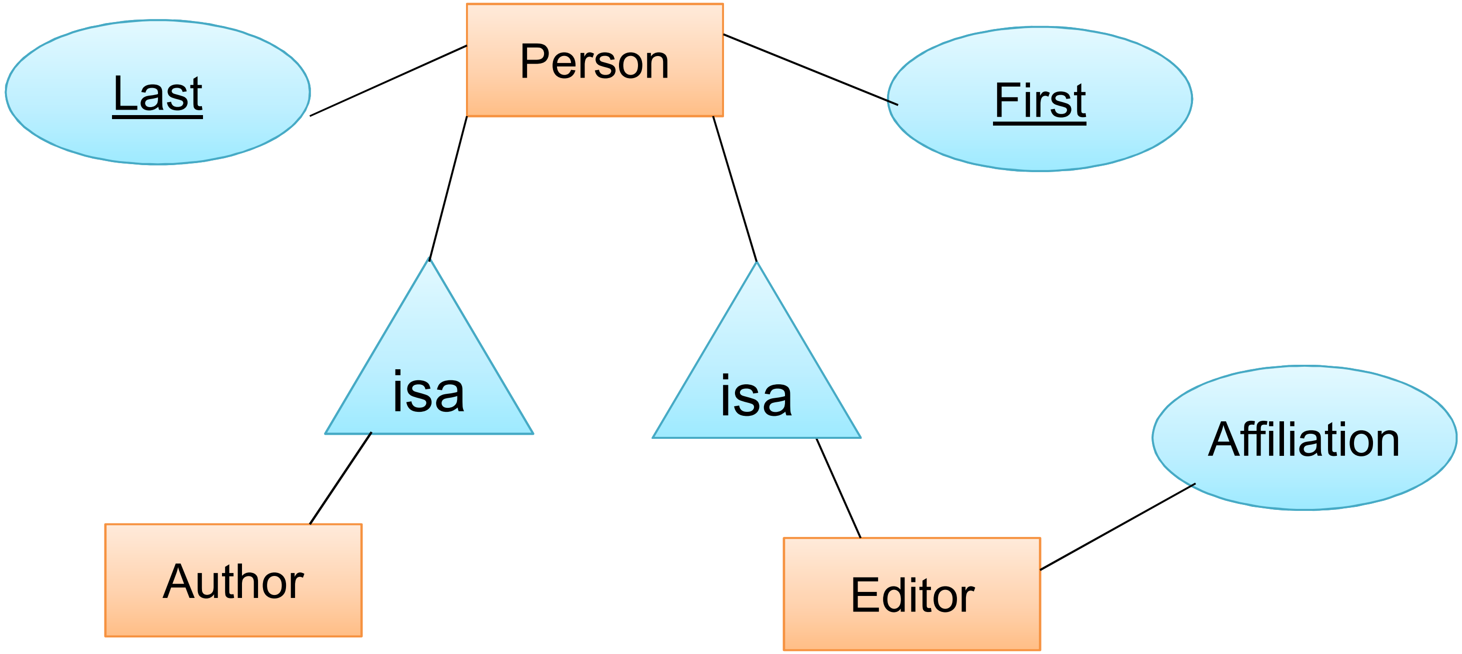
What's wrong with this model?



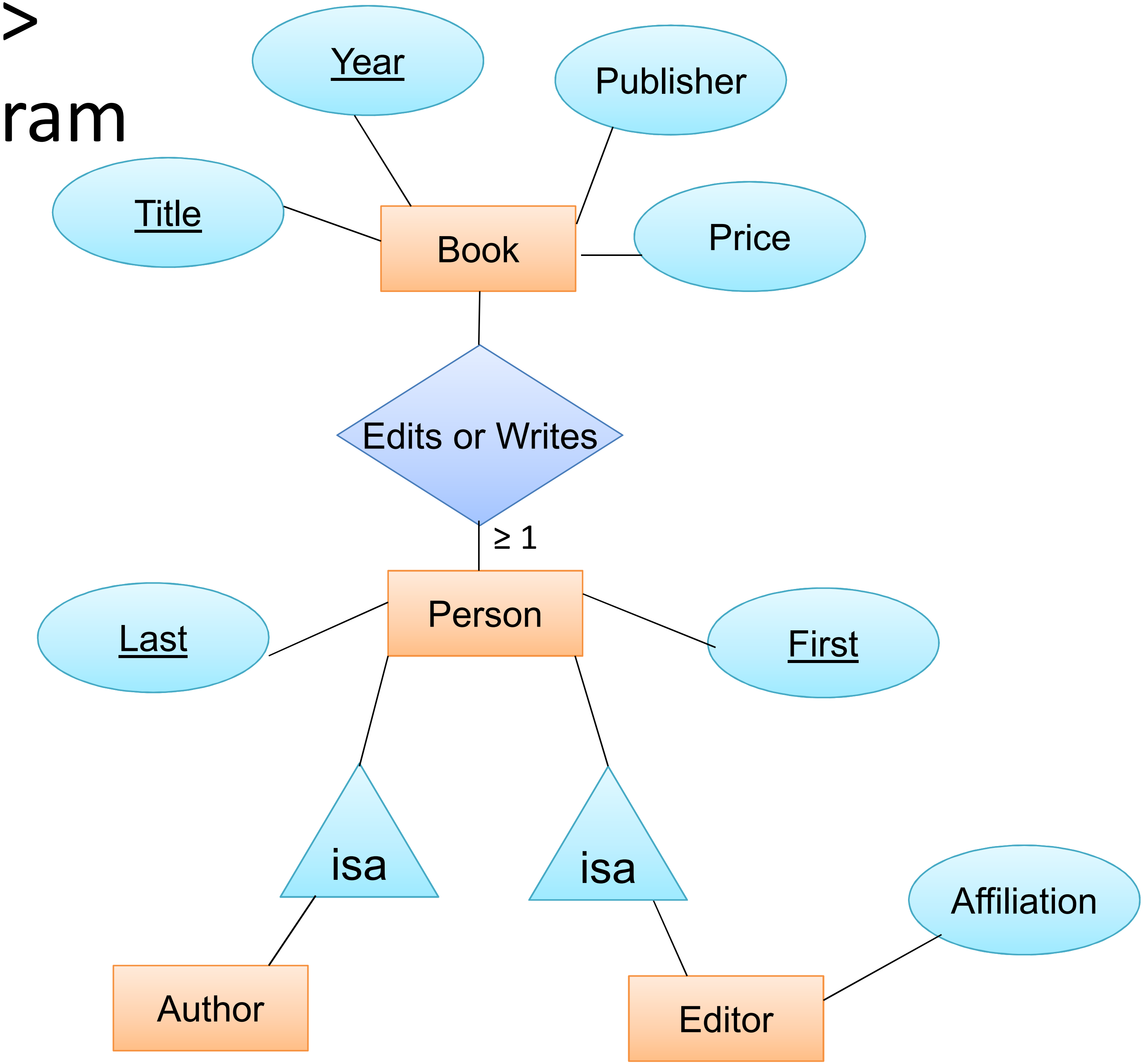
What’s wrong with this model?

- In the DTD, a book can have authors, or editors, but not both.
- Perhaps, we can we combine Author and Editor.
  - Define an entity set Person with attributes last and first.
  - Add is-a relationship such that Author is-a Person, and Editor is-a Person.

Modeling UnionTypes With Subclasses



XML -> E/R Diagram



E/R Diagram -> Relation

```
CREATE TABLE Book(
        title CHAR(30),
        year INT,
        publisher CHAR(30),
        price FLOAT,
PRIMARY KEY (title, year)
)
```

```
CREATE TABLE EditsOrWrites(
        first CHAR(20),
        last CHAR(20),
        title CHAR(30),
        year INT,
PRIMARY KEY (first, last, title, year),
FOREIGN KEY (first, last)
          REFERENCES  Person,
FOREIGN KEY (title, year)
          REFERENCES  Book
)
```

```
CREATE TABLE Person(
        first CHAR(20),
        last CHAR(20),
 PRIMARY KEY (first, last)
)
```

```
CREATE TABLE Author(
        first CHAR(20),
        last CHAR(20),
PRIMARY KEY (first, last),
FOREIGN KEY (first, last)
          REFERENCES  Person
)
```

```
CREATE TABLE Editor(
        first CHAR(20),
        last CHAR(20),
        affiliation CHAR(20),
PRIMARY KEY (first, last),
FOREIGN KEY (first, last)
          REFERENCES  Person
)
```

XPath to SQL (1)

- XPath = /bib/book[author[last="Ullman"][first="Jeff"]]

(ignoring editor)

- SQL = ?

XPath to SQL (1)

- XPath = /bib/book[author[last="Ullman"][first="Jeff"]]
- SQL =

```
SELECT b.*
FROM Book b, EditsOrWrites w
WHERE b.title = w.title
    AND b.year = w.year
    AND w.last = 'Ullman’
    AND w.first = 'Jeff’;
```

This does not return the names of the authors!

```
<!DOCTYPE bib [
        <!ELEMENT bib  (book* )>
        <!ELEMENT book  (title,  (author+ | editor+ ), publisher?, price )>
        <!ATTLIST book  year CDATA  #REQUIRED >
        <!ELEMENT author  (last, first )>
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        <!ELEMENT first  (#PCDATA )>
        <!ELEMENT affiliation  (#PCDATA )>
        <!ELEMENT publisher  (#PCDATA )>
        <!ELEMENT price  (#PCDATA )>
]>
```

XPath to SQL (1)

- XPath = /bib/book[author[last="Ullman"][first="Jeff"]]
- SQL =

```
SELECT b.*, w2.*
FROM Book b, EditsOrWrites w1, EditsOrWrites w2
WHERE b.title = w1.title AND b.year = w1.year
    AND b.title = w2.title AND b.year = w2.year
    AND w1.last = 'Ullman’ AND w1.first = 'Jeff';
```

XPath to SQL (2)

- XPath = /bib/book[author/last="Ullman"][author/first="Jeff"]
- SQL = ?

XPath to SQL (2)

- XPath = /bib/book[author/last="Ullman"][author/first="Jeff"]
- SQL =

```
SELECT b.*, w.*
FROM Book b, EditsOrWrites w,
          EditsOrWrites jeff, EditsOrWrites ullman
WHERE b.title = w.title AND b.year = w.year
     AND b.title = jeff.title AND b.year = jeff.year
     AND b.title = ullman.title AND b.year = ullman.year
     AND ullman.last = 'Ullman’ AND jeff.first = 'Jeff’;
```

Questions?